#### (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

# (19) World Intellectual Property Organization International Bureau





(43) International Publication Date 19 May 2005 (19.05.2005)

**PCT** 

## (10) International Publication Number WO 2005/045190 A1

(51) International Patent Classification<sup>7</sup>:

E21B 43/12,

(21) International Application Number:

PCT/EP2004/052826

(22) International Filing Date:

5 November 2004 (05.11.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 03104118.9

7 November 2003 (07.11.2003) EP

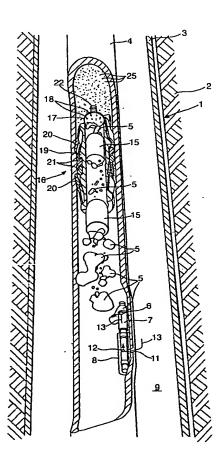
(71) Applicant (for AE, AG, AL, AM, AT, AU, AZ, BA, BB, BE, BG, BR, BW, BY, BZ, CH, CN, CO, CR, CU, CY, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, Fl, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,

LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, SZ, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW only): SHELL INTERNATIONALE RESEARCH MAATSCHAPPLJ B.V. [NL/NL]; Carel van Bylandtlaan 30, NL-2596 HR The Hague (NL).

- (71) Applicant (for CA only): SHELL CANADA LIMITED [CA/CA]; 400 - 4th Avenue S.W., Calgary, Alberta T2P 2H5 (CA).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): FERNANDES, Richard, Lawrence, Joseph [CA/NL]; Volmerlaan 8, NL-2288 GD Rijswijk (NL). SCHRAMA, Erik, Arie [NL/NL]; Volmerlaan 8, NL-2288 GD Rijswijk (NL).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,

[Continued on next page]

#### (54) Title: BUBBLE BREAKER ASSEMBLY



(57) Abstract: A method and system are disclosed for dispersing gas bubbles in a multiphase mixture in a production tubing (4) in an crude oil production well (1) or in a riser connected to such a well, by means of one or more bubble breaker assemblies (16) in which a plurality of orifices (18) are arranged that are located in a substantially eccentric position relative to a central axis of the tubing (4). The use of eccentric orifices (18) promotes the breaking up of large gas bubbles (15) into a large amount of smaller gas bubbles (25), which are finely dispersed in the fluid stream and only re-coalesce slowly into larger bubbles.

### WO 2005/045190 A1



CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

#### Published:

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.